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B. F. DAILEY.

BALLAST BURNING APPARATUS.

No. 556,087. Patented Mar. 10, 1896.

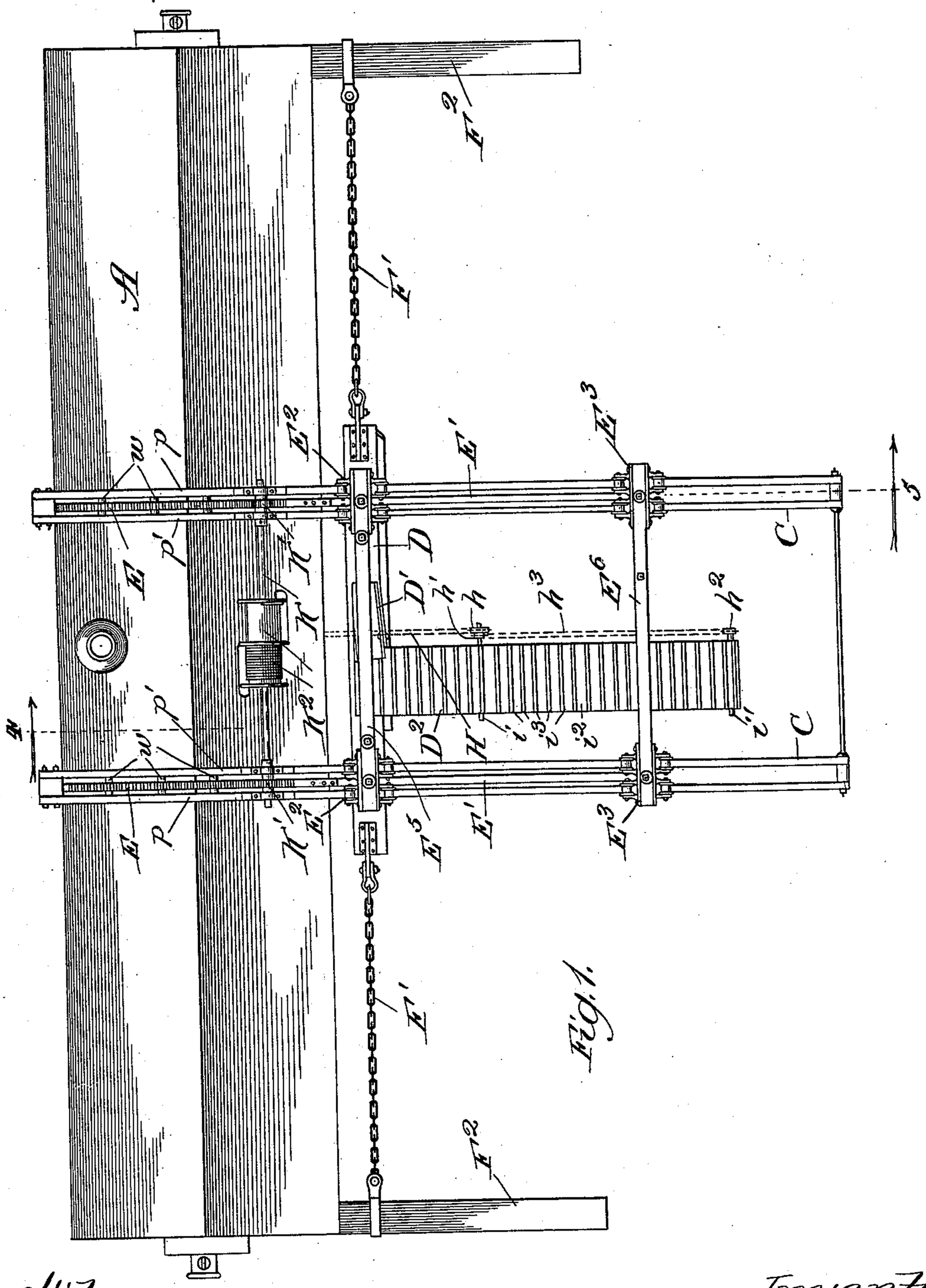

Fig. 1.

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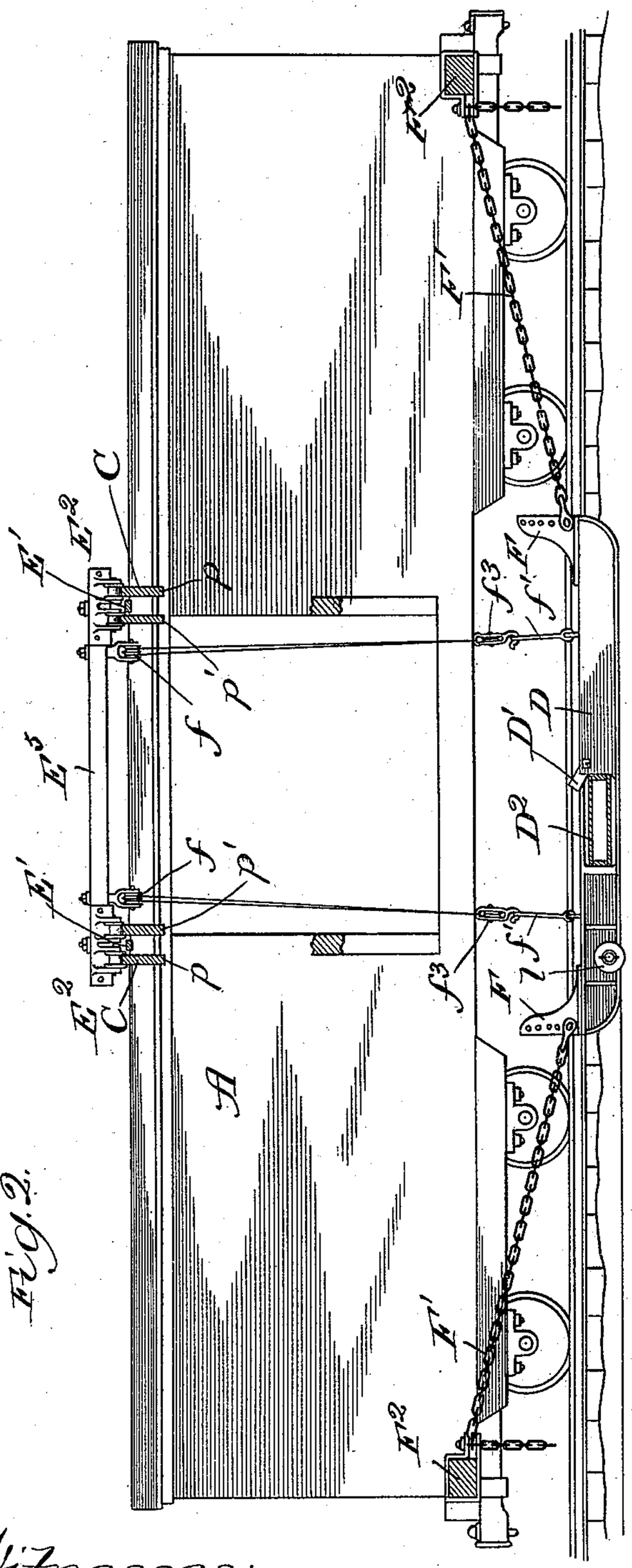

FIG. 2.

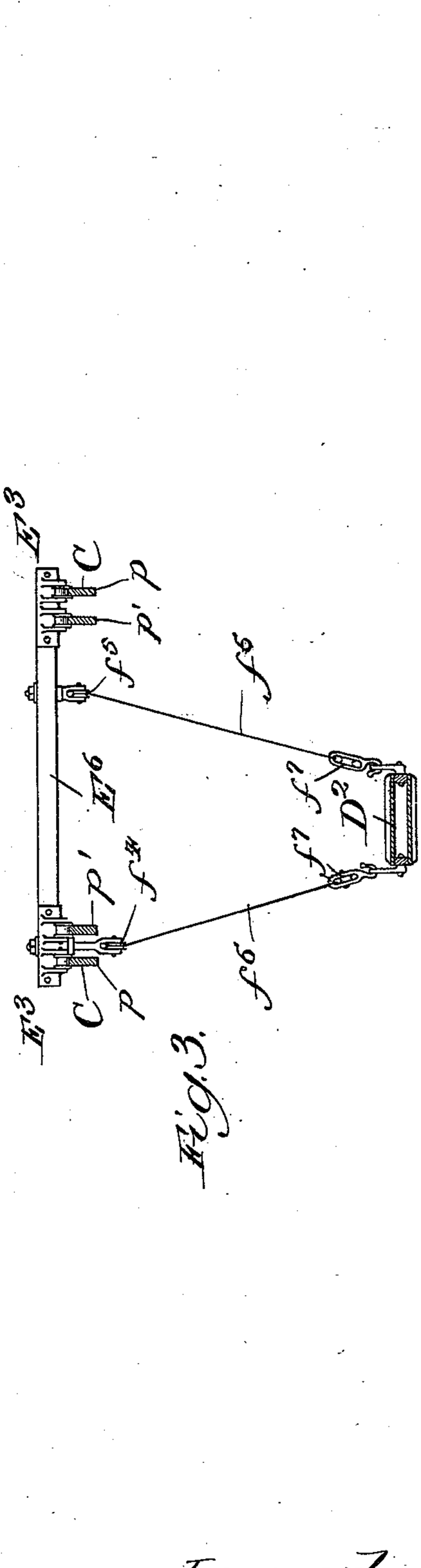

FIG. 3.

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(No Model.) 5 Sheets—Sheet 3.

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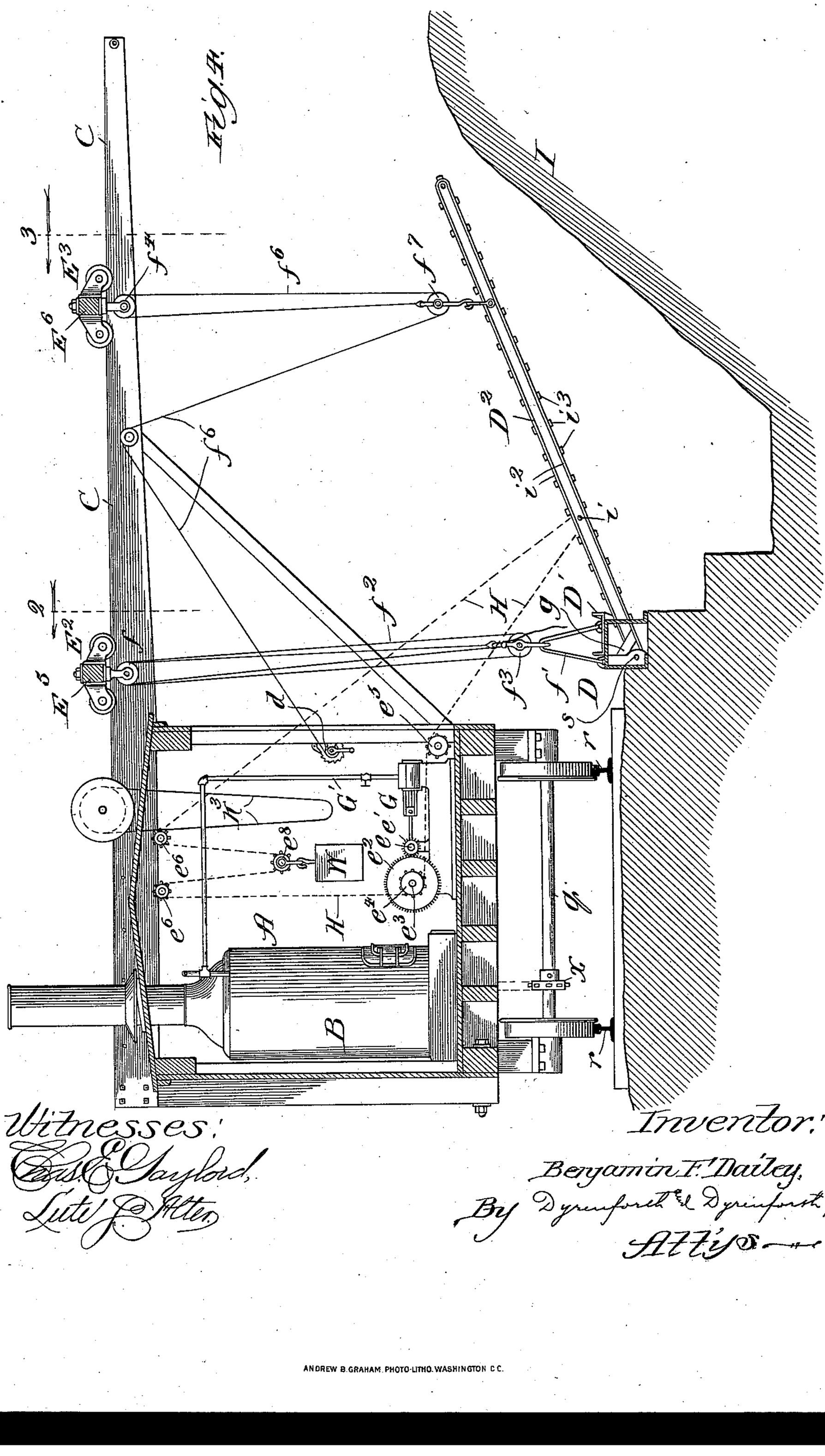

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(No Model.) 5 Sheets—Sheet 4.

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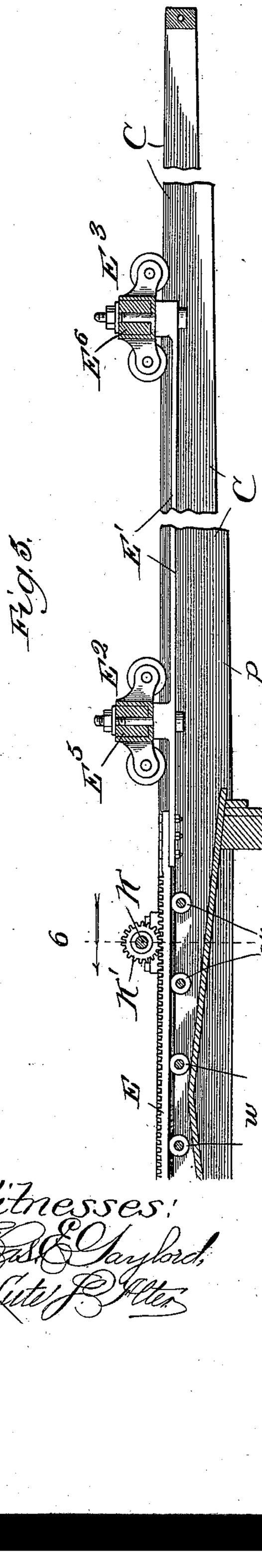

Fig. 5.

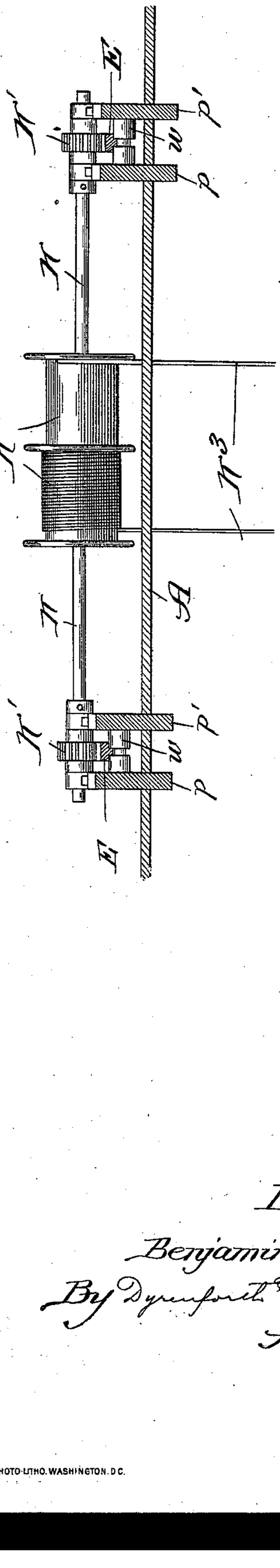

Fig. 6.

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(No Model.) 5 Sheets—Sheet 5.

B. F. DAILEY.

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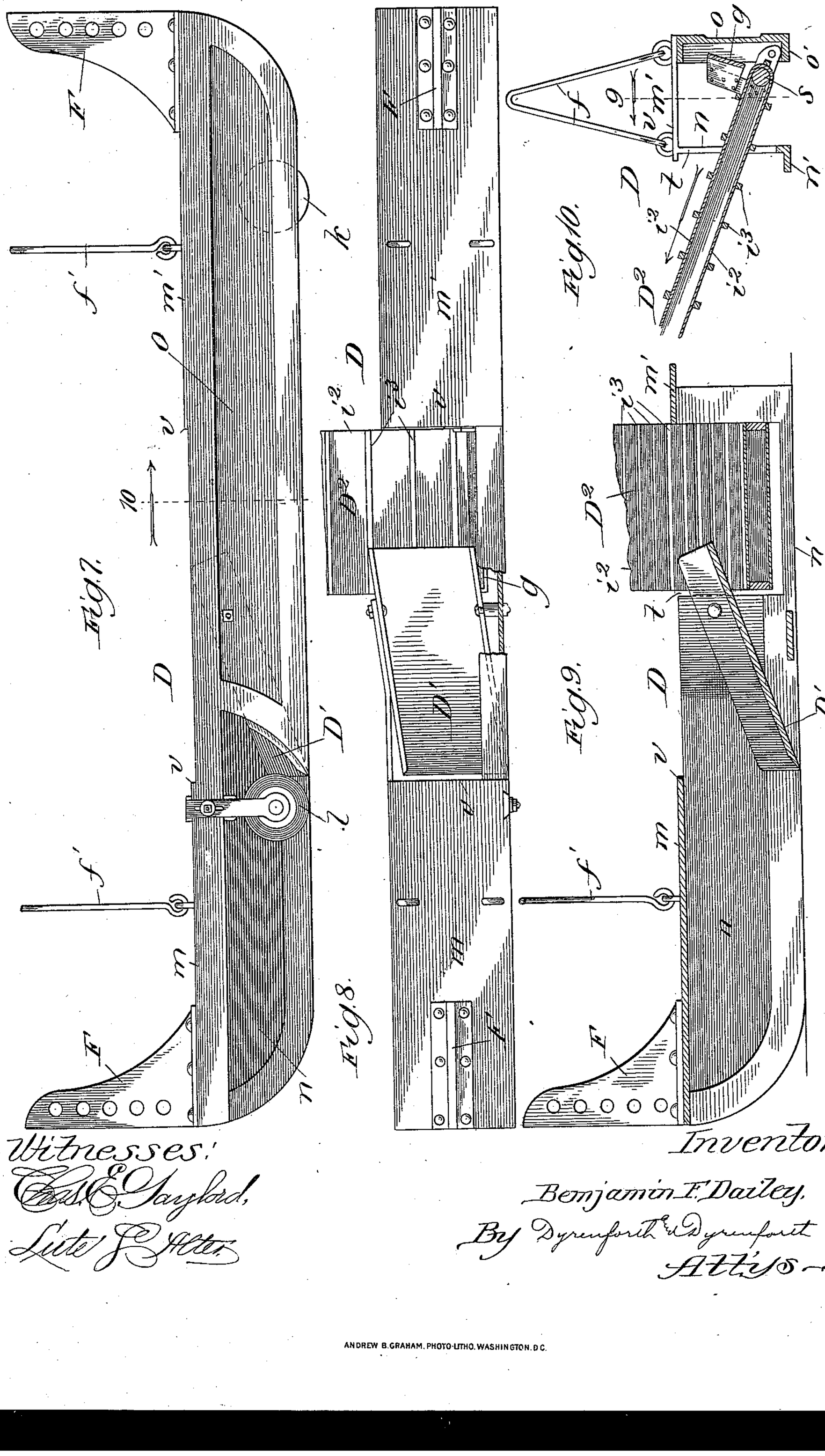

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

UNITED STATES PATENT OFFICE.

BENJAMIN F. DAILEY, OF MOUNT PLEASANT, IOWA.

BALLAST-BURNING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 556,087, dated March 10, 1896.

Application filed October 22, 1895. Serial No. 566,494. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN F. DAILEY, a citizen of the United States, residing at Mount Pleasant, in the county of Henry and State of Iowa, have invented a new and useful Improvement in Ballast-Burning Apparatus, of which the following is a specification.

My invention relates to an improvement in apparatus employed for digging clay from the ground and conveying it to the pile or "fire" in burning in the open air clay to reduce it to the igneous mass known as "ballast" by building a long fire on the ground and heaping thereon, with coal, clay dug from a trench extending along the fire.

Apparatus now generally employed for the purpose for which I have devised my apparatus involves a railway-track laid to extend along the line of the fire for the travel of a car equipped with its own driving mechanism, a boom projecting transversely of the car from its roof toward the fire, and scooping means controlled from the car to dig the clay from the ground between the fire and track, thereby forming a trench along the line, and to carry the clay so dug to and dump it upon the fire.

More definitely stated, my invention relates, particularly, to an improvement in the digging and conveying mechanisms and means for controlling their operation from the car.

Referring to the accompanying drawings, Figure 1 is a plan view of my improved apparatus; Fig. 2, a section taken at the line 2 on Fig. 4 and viewed in the direction of the arrow; Fig. 3, a section taken at the line 3 on Fig. 4 and viewed in the direction of the arrow; Fig. 4, a section taken at the line 4 on Fig. 1 and viewed in the direction of the arrow and enlarged; Fig. 5, a broken section taken at the line 5 on Fig. 1 and viewed in the direction of the arrow and enlarged; Fig. 6, a section taken at the line 6 on Fig. 5 and viewed in the direction of the arrow; Fig. 7, an enlarged view in side elevation of my improved combined plow or scoop and conveyer device; Fig. 8, a broken plan view of the same; Fig. 9, a broken longitudinal sectional view of the same, the section being taken at the line 9 on Fig. 10 and viewed in the direction of the arrow; and Fig. 10, a broken section taken at the line 10 on Fig. 7 and viewed in the direction of the arrow.

A is a railway-car, shown as of the ordinary box-car variety, supported to travel upon the rails r r of a railway-track, and containing a furnace and boiler B and a suitable engine (not shown) properly connected with an axle q of the car, as indicated at x, for controlling the locomotion of the car.

On the car-roof are supported, to extend transversely thereof and project to a desired distance beyond the side of the car at which the ballast-burning operation is to be carried on, two pairs of heavy timbers pp' and pp' at a suitable distance (say eight feet) apart, forming a boom C.

D is my improved combined scoop and conveyer device. As shown most clearly in Figs. 7 to 10, inclusive, it comprises a side o, of general sleigh-runner shape, extending from one end of the device past the transverse center thereof and having at its lower edge an inwardly-extending flange o', the opposite side n being of similar sleigh-runner shape and extending from the opposite end of the device past its transverse center, and provided upon its lower edge with an outwardly extending flange n'. These sides are connected along their upper edges by platforms m and m', extending respectively from the opposite ends of the device short of the opposite sides of the transverse center thereof to leave an open space between the points v v, Fig. 7, throughout a portion, say about one-half, of which the side n is cut out, as indicated at t in Figs. 9 and 10. These sides and platforms form the body portion of the device.

Between the sides o and n, at one side of the opening t, is fastened, to extend in downwardly-inclined position, the scoop D', shown of general rectangular shape, and adjacent to the lower inner side of which is suspended a vertically-adjustable colter or cutter l, and near one end of the device there is journaled to extend from the inner surface of the side n a wheel or roller k. To this same side n, at the opening t in the opposite side and just behind the higher end of the scoop D', is pivoted, as shown at s in Fig. 10, an endless-conveyer device D^2, comprising a rectangular frame carrying rotary shafts i and i' near its opposite ends and about which there extends the endless apron i^2 provided at intervals with transverse cleats i^3.

On one end of the roller i' is shown in Fig. 1 a sprocket-wheel h^2, and on the corresponding end of the shaft i are shown sprocket-wheels h' and h^2. The sprocket-wheels h' and h^2 are geared together by an endless chain h^3. By thus pivotally supporting the conveyer device D^2, which accordingly extends through the opening t to a desired distance beyond the side n, it is rendered vertically adjustable, and at its pivoted end it carries a shield or apron g, for a purpose hereinafter described.

On the parallel timbers forming the boom C are provided movable racks E E, having longitudinal extensions E′ E′, from their outer ends carrying the pairs of wheeled brackets E^2 E^2 and E^3 E^3, respectively connected by the cross-bars E^5 E^6. The racks E are supported on antifriction-rollers w journaled between the timbers p p'. From pulleys f f, extending from points adjacent to the wheeled brackets E^2, is suspended the combined scoop and conveyer device D, at bails f' provided on the platforms m and m', by suitable tackles f^2, connected at their lower ends with the bails by hooked pulley-blocks carrying the pulleys f^3. Thus the device D is suspended from the boom C to extend parallel with the car A along its side adjacent to the work to be performed, and it is dragged by the movement of the car, by connecting the device from adjustment-brackets F F thereon, through the medium of chains F′, with heavy timbers F^2 extending laterally from the lower corners of the respective side of the car.

In the same way that the device D is suspended from the boom C its conveyer D^2 is supported near its outer end from pulleys f^4 and f^5, depending respectively from a wheeled bracket E^3 and the cross-bar E^6, through the medium of tackles f^6 carrying pulley-blocks f^7 at their lower ends, hooked to the sides of the conveyer-frame.

As will thus be seen, the combined scoop and conveyer device may be raised and lowered, and may also be adjusted within, say, about eight feet, as to the distance thereof from the side of the car A.

For actuating the endless belt of the conveyer D^2, I show an engine G, which is preferably separate from that referred to as being employed to drive the car, and which is supplied with steam from the boiler B through the pipe G′. The engine G drives a rotary shaft e carrying a pinion e' to mesh with a cog-wheel e^2 on a rotary shaft e^3 carrying a sprocket-wheel e^4, about which a chain H passes, as also about a guiding sprocket-wheel e^5 over the sprocket-wheel h on the shaft i upon the conveyer-frame, and from the sprocket-wheel h the chain H passes about two sprocket-wheels e^6 e^6 journaled to the upper portion of the car A, and between which the chain is looped to carry a sprocket-pulley e^8 sustaining a weight W tending to counterbalance the conveyer in any position to which it is adjusted. This arrangement of the sprocket-chain H with its weighted loop permits it to be lengthened and shortened automatically to accommodate itself to the raising and lowering, as also to the position of lateral adjustment, of the conveyer.

The operation of the apparatus is as follows: With the railway-track built upon a site, the ground of which is clay suitable for burning into ballast, an incipient fire is built in the usual way with kindling material and throughout a desired length to extend alongside the track. The car A, equipped with my improved digging and conveying mechanism and imposed upon the track-rails r, is driven along the same, with the scoop-carrying portion of the device D bearing on the ground at least at one of its flanges o' n' and fastened in the manner described to the timbers F^2. As the car moves, dragging the device along with it in the direction in which the scoop D′ penetrates the ground, (the motion of the device being facilitated by the provision of the roller k,) and with the conveyer D^2 in action, the colter l cuts the ground to the desired depth along the line at the side of the plane traversed by the scoop nearest the track, and the scoop scoops up the dirt, which is carried through it by the continued advance of the car, and dumped through the back of the scoop on the conveyer D^2, which carries it continuously to its outer end, whence it is discharged upon the breast of the fire. It should be stated, in this connection, that before digging the dirt from the ground I prefer to strew it with coal, in order that the clay which is dug shall be supplied with the coal for burning it when it is dropped upon the fire, and it will, moreover, be seen that the cut made by my improved apparatus is clean in the sense of digging up all or practically all the dirt that is loosened.

To prevent clogging of the inner or pivotal end of the conveyer D^2 by the dirt which falls upon it from the higher end of the scoop, which is in alignment with it, I provide the apron device g, which, being supported on the conveyer-frame, rises and falls with the latter in its adjustment.

The pile or fire referred to is indicated in Fig. 4 of the drawings and denoted by the reference-letter I. The space between the fire and line of track upon which the car A travels and from which the clay is dug (thereby forming a longitudinal trench in which the pile is continued, to widen it) being considerably wider than the width of the body portion of the device carrying the scoop D′, it is important to be able to shift the device to desired points between the track and fire. Accordingly I provide the racks E and described mechanism connected therewith, to which is added a stationary rotary shaft K carrying pinions K′ meshing with the racks, and also carrying the drum device K^2, about which a rope K^3 is wound with numerous turns and depends through the roof of the car into the latter, where it is conveniently accessible to an operator. By pulling upon one or the

other side of this rope the shaft K is turned accordingly to drive the racks E forward or backward, thereby carrying the extensions E′ with them, as also the wheeled brackets E^2 E^3, and, of course, the combined scoop and conveyer device D bodily, enabling the scooping operation to be performed upon different planes along the line of the track between the latter and the fire. When the device D is thus shifted, attendants are required to shift, accordingly, the chains F′ along the timbers F^2.

When it is desired to run the car backward or produce its locomotion without operating the device D, the latter requires to be raised, and when the device is again brought into operation it requires to be lowered. The control of the combined scoop and conveyer for thus elevating and lowering it is had by two operators, one stationed on each platform *m m′*, this being all the hands required for controlling the operation of my improved apparatus except an engineer and a fireman. I adjust the height of the device D by properly manipulating the tackles f^2 f^6, the last-named being fastened, as indicated at *d* in Fig. 4, to a roller in the car A, held by a dog for rigidly sustaining the conveyer in its adjusted position, the roller being turned, for raising and lowering the conveyer, by the engineer or fireman.

From the foregoing description it will be seen that by my improvement I afford means for scooping clay from the ground and transferring it to the burning pile of ballast, whereby the operation of ballast-burning is greatly facilitated and may be carried on with the employment of the fewest possible hands, thus materially lessening the expense of manufacturing the product, and that my improved machine takes care of all the clay that is dug, thereby avoiding the performance by it of any waste or unnecessary work.

What I claim as new, and desire to secure by Letters Patent, is—

1. A combined scoop and conveyer device for ballast-burning apparatus, comprising a body portion, an inclined scoop supported thereon and a vertically-adjustable endless conveyer pivotally supported on said body portion to extend at an angle therefrom from behind the discharge end of the scoop, and provided at its pivotal end with a shield, substantially as described.

2. A combined scoop and conveyer device for ballast-burning apparatus, comprising a body portion formed of the runner-shaped sides *o*, *n*, and platforms *m*, *m′* connecting said sides, a scoop D′ between the sides, a vertically-adjustable endless conveyer D^2 pivotally supported on said body portion to extend laterally therefrom, means on said body portion by which to suspend it, and means thereon by which to fasten it to a suitable drag, substantially as described.

3. A combined scoop and conveyer device for ballast-burning apparatus, comprising a body portion formed of the runner-shaped sides *o*, *n*, flanged along their lower edges and connected by platforms *m*, *m′*, a scoop D′ secured between said sides, a vertically-adjustable endless conveyer D^2 pivotally supported on said body portion to extend laterally therefrom from a point behind the discharge end of the scoop, means on the said body portion by which to suspend it, and means thereon by which to fasten it endwise to a suitable drag, substantially as described.

4. In a ballast-burning apparatus, the combination with a car of a boom C projecting beyond the side of the car from its roof, rack-and-pinion mechanism supported on said roof, a combined scoop and conveyer device comprising a body portion carrying a scoop and a traveling conveyer extending laterally from said body portion, traveling supports on said boom respectively near its inner and outer ends and connected together and with said rack-and-pinion mechanism, whereby operating the latter simultaneously moves, accordingly, said traveling supports, hoisting means by which said device is suspended at its body portion and at its conveyer from said traveling supports, and means for driving the endless conveyer, substantially as and for the purpose set forth.

5. In a ballast-burning apparatus, the combination with a car of a boom C projecting beyond the side of the car from its roof, racks E supported to move longitudinally on said boom, a rotary shaft K carrying pinions K′ engaging said racks and a winding-drum K^2 having wound about it a rope K^3 extending into the car, extensions E′ on said racks carrying wheeled supports E^2, E^3, movable therewith, the combined scoop and conveyer device comprising a body portion carrying a scoop and a vertically-adjustable pivotal traveling conveyer extending laterally from said body portion from the plane behind the discharge end of the scoop, pulley-block and tackle mechanism by which said body portion is suspended from the supports E^2, pulley-block and tackle mechanism by which said conveyer is connected from near its outer end with the supports E^3, driving means on the car for the endless conveyer having an endless-chain connection H therewith containing a loop suspended in the car and carrying an adjustable weight W, and timbers projecting from the base of the side of the car adjacent to which said device is suspended and with which said device is connected from opposite ends to be dragged by the movement of the car, all being constructed and arranged to operate substantially as and for the purpose set forth.

BENJAMIN F. DAILEY.

In presence of—
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J. H. LEE.